What is claimed is:

1. A predistortion circuit comprising:

a divider for branching an input signal into plural branched signals;

a delay circuit for delaying one of the branched signals by a predetermined delay time;

a distortion generating circuit for receiving the other branched signal and for generating a distortion signal;

a vector adjustment circuit for varying an amplitude and a phase of the distortion signal; and

a combining circuit for combining an output signal of the delay circuit and an output signal of the vector adjustment circuit and for outputting a combined signal to circuit means as a subject of linearization to be provided downstream of and connected directly or indirectly to the combining circuit,

wherein the delay time of the delay circuit is set based on a phase difference of a distortion that would be generated by the circuit means if the vector adjustment circuit did not produce the output signal.

2. A predistortion circuit comprising:

a divider for branching an input signal into plural branched signals;

a delay circuit for delaying one of the branched signals by a predetermined delay time;

a distortion generating circuit for receiving the other branched signal and for generating a distortion signal;

an amplitude frequency characteristic adjustment circuit for varying an amplitude frequency characteristic of the distortion signal;

a vector adjustment circuit for varying an amplitude and a phase of the distortion signal that is output from the amplitude frequency characteristic adjustment circuit; and

a combining circuit for combining an output signal of the delay circuit and an output signal of the vector adjustment circuit.

3. The predistortion circuit according to claim 2, wherein the delay time of the delay circuit is set based on a phase difference of a distortion that would be generated by circuit means as a subject of linearization to receive an output signal of the combining circuit if the vector adjustment circuit did not produce the output signal.

4. The predistortion circuit according to claim 1 or 3, wherein the delay time of the delay circuit is set based on the phase difference in such a manner that a first delay time

is so set that a difference between the first delay time and a second delay time substantially equivalent to or corresponding to the phase difference, where the first delay time is the delay time itself and the second delay time is a delay time of a signal that is input to the combining circuit via the distortion generation circuit and the vector adjustment circuit.

5. The predistortion circuit according to claim 1 or 3, wherein the delay time of the delay circuit is variable.

6. The predistortion circuit according to claim 1 or 3, wherein the delay time of the delay circuit is fixed at a predetermined value.

7. A predistortion circuit comprising:

a divider for branching an input signal into plural branched signals;

a delay circuit for receiving one of the branched signals;

a distortion generating circuit for receiving the other branched signal and for generating a distortion signal;

at least two filter circuits for separating the distortion signal into distortion signals having different frequencies;

at least two vector adjustment circuits connected to outputs of the respective filter circuits directly or indirectly, for varying amplitudes and phases of the distortion signals that are output from the respective filter circuits; and

a combining circuit for combining an output signal of the delay circuit and combined output signals of the respective vector adjustment circuits.

8. The predistortion circuit according to claim 7, further comprising at least two amplitude frequency characteristic adjustment circuits for varying amplitude frequency characteristics of distortion signals that are output from the respective filter circuits, wherein the vector adjustment circuits are connected to outputs of the respective amplitude frequency characteristic adjustment circuits.

9. The predistortion circuit according to any one of claims 1, 2, 3, 7, and 8, wherein the distortion generation circuit comprises a limiter amplifier.

10. The predistortion circuit according to any one of claims 1, 2, 3, 7, and 8, wherein the distortion generation circuit comprises a diode.

11. The predistortion circuit according to any one of claims 1, 2, 3, 7, and 8, wherein the distortion generation circuit comprises a zero-bias diode.

12. The predistortion circuit according to any one of claims 1, 2, 3, 7, and 8, wherein the distortion generation circuit comprises:

a divider for branching an input signal into plural signals;

a delay circuit connected to one output side of the divider;

a circuit connected to the other output side of the divider and comprising a nonlinear device;

a vector adjustment circuit connected to an output side of the circuit comprising the nonlinear device; and

a combining circuit for combining an output signal of the delay circuit and an output signal of the vector adjustment circuit.

13. A low-distortion power amplifier comprising:

a combining circuit for combining an input signal with another signal;

a power amplifier for receiving an output signal of the combining circuit;

a divider for branching an output signal of the power amplifier into plural branched signals;

a distortion extraction circuit for extracting a distortion signal from one of the branched signals;

an amplitude frequency characteristic adjustment circuit for varying an amplitude frequency characteristic of the distortion signal; and

a vector adjustment circuit for varying an amplitude and a phase of the distortion signal that is output from the amplitude frequency characteristic adjustment circuit,

wherein an output signal of the vector adjustment circuit is input to the combining circuit as said another signal and the other branched signal is output from the low-distortion power amplifier.

14. A low-distortion power amplifier comprising:

a combining circuit for combining an input signal with another signal;

a power amplifier for receiving an output signal of the combining circuit;

a divider for branching an output signal of the power amplifier into plural branched signals;

a distortion extraction circuit for extracting a distortion signal from one of the branched signals;

at least two filter circuits for separating the distortion signal into distortion signals having different frequencies; and

at least two vector adjustment circuits for varying amplitudes and phases of the distortion signals that are output from the respective filter circuits,

wherein a signal obtained by combining together output signals of the vector adjustment circuits is input to the combining circuit as said another signal and the other branched signal is output from the low-distortion power amplifier.

15. A low-distortion power amplifier comprising:

a combining circuit for combining an input signal with another signal;

a power amplifier for receiving an output signal of the combining circuit;

a divider for branching an output signal of the power amplifier into plural branched signals;

a distortion extraction circuit for extracting a distortion signal from one of the branched signals;

at least two filter circuits for separating the distortion signal into distortion signals having different frequencies;

at least two amplitude frequency characteristic adjustment circuits for adjusting amplitude frequency characteristics of the distortion signals that are output from the respective filter circuits; and

at least two vector adjustment circuits for varying amplitudes and phases of distortion signals that are output from the respective filter circuits,

wherein a signal obtained by combining together output signals of the vector adjustment circuits is input to the combining circuit as said another signal and the other branched signal is output from the low-distortion power amplifier.

16. A control method for the predistortion circuit according to any one of claims 1, 2, 3, 7, and 8, comprising the steps of:

connecting a power amplifier to an output side of the predistortion circuit;

detecting a magnitude of a distortion signal generated by the power amplifier; and

controlling at least one of the amplitude frequency characteristic adjustment circuit or circuits, the vector adjustment circuit or circuits, and the delay time of the delay circuit so as to minimize the detected magnitude of the distortion signal.

17. The control method for the low-distortion power amplifier according to any one of claims 13 to 15, comprising the steps of:

detecting a magnitude of the distortion signal that is output from the distortion extraction circuit; and

controlling at least one of the amplitude frequency characteristic adjustment circuit or circuits and the vector adjustment circuit or circuits so as to minimize the detected magnitude of the distortion signal.

18. A linearized power amplifier comprising:

the predistortion circuit according to any one of claims 1, 2, 3, 7, and 8;

a power amplifier for receiving an output signal of the predistortion circuit;

a divider for branching an output signal of the power amplifier into plural branched signal;

detecting means of receiving one of the branched signals and detecting an amplitude and a phase of a distortion signal that is output from the power amplifier; and

control means of controlling at least one of the amplitude frequency characteristic adjustment circuit or circuits, the vector adjustment circuit or circuits, and the delay circuit

of the predistortion circuit so as to minimize a distortion generated by the power amplifier based on an output signal of the distortion amplitude and phase detecting means,

wherein the other branched signal becomes at least one output signal of the linearized power amplifier.

19. A feedforward amplifier having a predistortion circuit, comprising:

a divider for branching an input signal into plural branched signals;

a first vector adjustment circuit for varying an amplitude and a phase of one of the branched signals;

the predistortion circuit according to any one of claims 1, 2, 3, 7, and 8 for receiving an output signal of the first vector adjustment circuit;

a first power amplifier for receiving an output signal of the predistortion circuit;

first distortion level detecting means of detecting a magnitude of a distortion component included in an output signal of the first power amplifier;

a first delay circuit for receiving the other branched signal;

a first combining circuit for combining an output signal of the first delay circuit and the output signal of the first power amplifier;

a second delay circuit for delaying the output signal of the first power amplifier;

signal level detecting means of detecting a magnitude of an output signal of the first combining circuit;

a second vector adjustment circuit for varying an amplitude and a phase of the output signal of the first combining circuit;

a second power amplifier for receiving an output signal of the second vector adjustment circuit;

a second combining circuit for combining an output signal of the second power amplifier and an output signal of the second delay circuit;

second distortion level detecting means of detecting a magnitude of a distortion component included in an output signal of the second combining circuit; and

control means of controlling the predistortion circuit, the first vector adjustment circuit, and the second vector adjustment circuit based on output signals of the first distortion level detecting means, the signal level detecting means, and the second distortion level detecting means, respectively,

wherein the control means repeatedly performs, in arbitrary order, a first control of controlling at least the predistortion circuit so as to minimize a distortion level detected by the first distortion level detecting means, a second control of controlling at least the first vector adjustment circuit so as to minimize a signal level detected by the signal level detecting means, and a third control of controlling at least the second vector adjustment circuit so as to minimize a distortion level detected by the second distortion level detecting means.

20. The feedforward amplifier having a predistortion circuit according to claim 19, wherein:

the first delay circuit is a variable delay circuit whose delay time is variable;

a variation amount of a delay time when each of the first vector adjustment circuit and the predistortion circuit was controlled is stored in the control means; and

the control means controls the predistortion circuit and the variable delay circuit as the first control, controls the first vector adjustment circuit and the variable delay circuit as the second control, and controls only the second vector adjustment circuit as the third control.

21. A predistortion circuit comprising:

a divider for branching an input signal into plural branched signals;

a delay circuit for delaying one of the branched signals by a predetermined delay time;

a distortion generating circuit for receiving the other branched signal and for generating a distortion signal;

a vector adjustment circuit for varying an amplitude and a phase of the distortion signal; and

an amplitude frequency characteristic adjustment circuit for varying an amplitude frequency characteristic of the distortion signal that is output from the vector adjustment circuit;

a combining circuit for combining an output signal of the delay circuit and an output signal of the vector adjustment circuit.